REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated February 14, 2006 (U.S. Patent Office Paper No. 20060208). In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

As outlined above, claims 1-5 and 7-18 stand for consideration in this application, wherein claim 2 is being canceled without prejudice or disclaimer, while claims 1, 3-5 and 7-18 are being amended to correct formal errors and to more particularly point out and distinctly claim the subject invention. All amendments to the application are fully supported therein, including Figs. 6 and 7 and page 21, line 26 – page 22, line 14 of the specification. Applicant hereby submits that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

The 35 U.S.C. §102(e) rejection

Claims 4, 5, 14 and 18 were rejected under 35 U.S.C. §102(e) as being anticipated by Yoshida et al. (US Doc. No. 2002/0024153A1).

According to the M.P.E.P. §2131, a claim is anticipated under 35 U.S.C. §102 (a), (b), and (e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

As mentioned above, claims 8-10, 12, and 15 are being amended so as to depend on claim 1. The Examiner admitted in the rejection under 35 U.S.C. §103(a) that Yoshida fails to disclose that the laser contains quantum wells. The present invention as now recited in claim 1 provides said indirect semiconductor having an asymmetric quantum well structure. Therefore, Yoshida does not show every element recited in claims 4, 5, 14, and 18, which depend on claim 1. Accordingly, claims 4, 5, 14, and 18 is not anticipated by Yoshida.

The First 35 U.S.C. §103(a) rejection

Claims 1-3, 7, and 8 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Yoshida in view of Valster et al. (US Pat. No. 5,296,717). Claim 2 is being canceled, and therefore the rejection of claim 2 is moot. The rejection of claims 1, 3, 7, 8 is respectfully traversed for the reasons set forth below.

According to the Manual of Patent Examining Procedure (M.P.E.P. §2143),

> To establish a prima facie case of obviousness, three basis criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both not found in the prior art, not in the applicant's disclosure.

Claim 1

The Office Action contends that Yoshida discloses an optical head characterized by a light source formed of an indirect semiconductor laser, a lens for focusing a light beam from the light source onto a medium, and a detector for detecting a reflected light beam from the medium except that Yoshida does not disclose that the laser contains quantum wells. The Office Action further contends that Valster discloses a light emitting semiconductor device with an active layer that has a quantum well structure for emitting a light beam. The Office Action further contends that that Valster discloses that the quantum well structure is asymmetric since Valster discloses making the quantum well layer thicker because of a disorderly distribution. The Examiner interprets this to mean that the distribution is asymmetrical, and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the disclosure of Yoshida with the quantum well structures as disclosed by Valster. The motivation to combine would have been to produce a more intense and direct laser beam. Applicant respectfully disagrees.

The present invention as now recited in claim 1 provides that an optical head comprises a light source for emitting a light beam, a lens for focusing the light beam onto a medium, and a detector for detecting a reflected light beam from the medium, wherein the light source comprises a semiconductor laser comprising an active layer and a barrier layer, said active layer being an indirect semiconductor, said indirect semiconductor having an

asymmetric quantum well structure in which band structures of a conduction band and a valence band are left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern.

In contrast, Valster merely shows that quantum well layers are allowed to be comparatively thick because the distribution of In and Ga atoms on the sublattice of a crystal is disorderly and the accompanying band gap is comparatively great. A band gap is an energy difference between the top of the valence band and the bottom of the conduction band. A band structure means each of a conduction band and a valence band. (See page 19, lines 24-25 of the specification) However, Valster does not explicitly or implicitly show or suggest that asymmetry of the band structure pattern is caused by the disordered distribution of In and Ga atoms on the sublattice. In other words, Valster says nothing about the band structure being left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern. ,

Therefore, even if Valster is combined with Yoshida, the combination would still fail to show or suggest, among other features, the limitation that said indirect semiconductor having an asymmetric quantum well structure in which band structures of a conduction band and a valence band are left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern, as now recited in claim 1.

Furthermore, there is no suggestion or motivation to combine Valster with Yoshida explicitly or implicitly in Valster or Yoshida, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 1. Accordingly, claim 1 is not obvious in view of all the prior art.

Claims 3, 7, 8

As to dependent claims 3, 7, 8, the arguments set forth above with respect to independent claim 1 are equally applicable here. The base claim being allowable, claims 3, 7, 8 must also be allowable.

The Second 35 U.S.C. §103(a) rejection

Claim 11 was rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Yoshida in view of Valster in further view of Chappel-Sokol et al. (US Pat. No. 5,354,707). This rejection is respectfully traversed for the reasons set forth below.

The Office Action mailed on 9/20/2005 contends that Yoshida failed to disclose that the material of the indirect semiconductor is of SiGe group, however, Chappel discloses this feature, and therefore claim 11 is obvious. Applicant respectfully disagrees.

As to dependent claim 11, the arguments set forth above with respect to independent claim 1 are equally applicable here. Also, Chappel shows that there is lattice mismatch between Ge and Si in a Si-Ge alloy. However, Chappel does not explicitly or implicitly show or suggest the limitation recited in claim 1 that Yoshida and Valster fail to show, namely that said indirect semiconductor having an asymmetric quantum well structure in which band structures of a conduction band and a valence band are left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern.

Furthermore, there is no suggestion or motivation to combine Chappel with Valster and Yoshida explicitly or implicitly in Chappel, Valster or Yoshida, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 1, upon which claim 11 depends. Accordingly, claim 11 is not obvious in view of all the prior art.

The Third 35 U.S.C. §103(a) rejection

Claim 15 was rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Yoshida in view of Hayashi (US Pat. No. 6,394,655 B1). This rejection is respectfully traversed for the reasons set forth below.

The Office Action mailed on 9/20/2005 contends that Yoshida failed to disclose that an indirect laser incorporating a multi-layer film at an end face of a resonator and serving as a light source. However, Hayashi discloses this feature, and therefore claim 15 is obvious. Applicant respectfully disagrees.

As to dependent claim 15, the arguments set forth above with respect to independent claim 1 are equally applicable here. Also, Hayashi does not explicitly or implicitly show or suggest the limitation recited in claim 1 that Yoshida fails to show, namely that said indirect semiconductor having an asymmetric quantum well structure in which band structures of a conduction band and a valence band are left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern.

Furthermore, there is no suggestion or motivation to combine Hayashi with Yoshida explicitly or implicitly in Hayashi or Yoshida, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of

the invention as recited in claim 1, upon which claim 15 depends. Accordingly, claim 15 is not obvious in view of all the prior art.

The Fourth 35 U.S.C. §103(a) rejection

Claim 16 was rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Yoshida in view of Momoo (US Pat. No. 6,741,538 B1). This rejection is respectfully traversed for the reasons set forth below.

The Office Action mailed on 9/20/2005 contends that Yoshida failed to disclose that a waveband pass filter for limiting the wavelength of a light beam from the semiconductor laser, however, Momoo discloses this feature, and therefore claim 65 is obvious. Applicant respectfully disagrees.

As to dependent claim 16, the arguments set forth above with respect to independent claim 1 are equally applicable here. Also, Momoo does not explicitly or implicitly show or suggest the limitation recited in claim 1 that Yoshida fails to show, namely that said indirect semiconductor having an asymmetric quantum well structure in which band structures of a conduction band and a valence band are left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern.

Furthermore, there is no suggestion or motivation to combine Momoo with Yoshida explicitly or implicitly in Momoo or Yoshida, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 1, upon which claim 16 depends. Accordingly, claim 16 is not obvious in view of all the prior art.

The Fifth 35 U.S.C. §103(a) rejection

Claim 17 was rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Yoshida in view of Brown (US Pat. No. 5,625,729). This rejection is respectfully traversed for the reasons set forth below.

The Office Action mailed on 9/20/2005 contends that Yoshida failed to disclose that a cooler for lowering the laser temperature, however, Brown discloses this feature, and therefore claim 65 is obvious. Applicant respectfully disagrees.

As to dependent claim 17, the arguments set forth above with respect to independent claim 1 are equally applicable here. Also, Brown does not explicitly or implicitly show or suggest the limitation recited in claim 1 that Yoshida fails to show, namely that said indirect

semiconductor having an asymmetric quantum well structure in which band structures of a conduction band and a valence band are left-right asymmetric with respect to a center of the quantum well structure in a band structure pattern.

Furthermore, there is no suggestion or motivation to combine Brown with Yoshida explicitly or implicitly in Brown or Yoshida, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 1, upon which claim 17 depends. Accordingly, claim 17 is not obvious in view of all the prior art.

Allowable Subject Matter

Applicant thanks the Examiner for holding that claims 9, 10, 12, and 13 would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant acknowledges the Examiner's statement of reasons for allowance as set forth in the Office Action. However, Applicant will point out that the reasons for allowability of the above referenced claims are not limited to the reasons for allowance as set forth in the Office Action.

As to dependent claims 9, 10, 12, and 13, the arguments set forth above with respect to independent claim 1 are equally applicable here. The base claim being allowable, claims 9, 10, 12, and 13 must also be allowable in the form of a dependent claim.

Conclusion

In view of all the above, Applicant respectfully submits that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and phone number indicated below.

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